IN REPLY REFER TO:

United States Department of the Interior

NATIONAL PARK SERVICE
Coastal Research Center
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National Biological Survey

MEMORANDUM

To: Susan Alberts, National Park Service, NARO, Boston, MA
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David Manski, Resource Management, Cape Cod National Seashore, MA
John Portnoy, National Biological Survey, Cape Cod NS, MA
Vic Mastro, USDA, APHIS, MA
Florence Peterson, USDA Forest Service, Durham, NH

From: Howard Ginsberg, National Biological Survey, Cooperative Research Unit, University of Rhode Island

Re: Proposed surveillance protocol for browntail moth, *Euproctis chrysorrhoea*, on Cape Cod

Date: 21 December 1993

The purpose of this memo is to outline a surveillance program for browntail moth, *Euproctis chrysorrhoea*, on Cape Cod. The protocol was developed at a meeting held at Cape Cod National Seashore on 17 December 1993. Sampling will be performed by USDA Forest Service staff with the support of on-site National Park Service personnel. The sampling program is designed to require one week each year, during the period when *E. chrysorrhoea* larvae are in winter webs (October through March). Participants, based on field results, can adjust sampling frequency to less than once per year, or can take extra samples in any given year, depending on the population status of *E. chrysorrhoea* on Cape Cod. The first samples are tentatively scheduled for 7-11 March 1994.

Sampling program

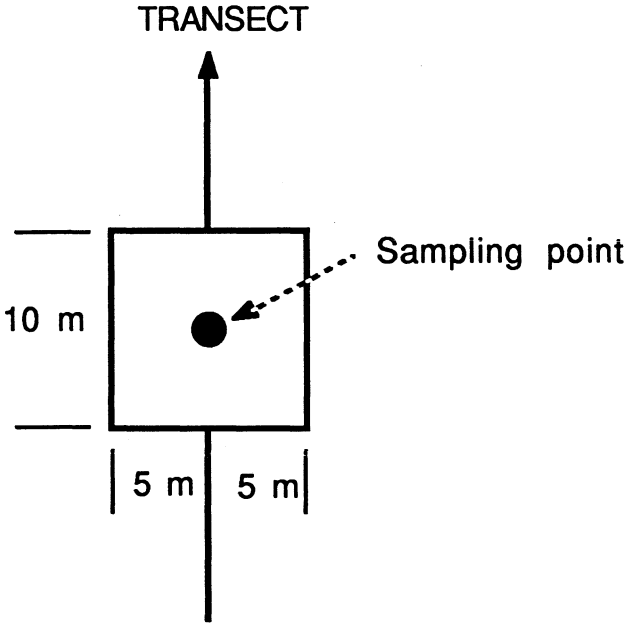
Sampling will be concentrated along ten bay-to-ocean transects that are situated four kilometers apart on the outer Cape (see attached map). The point where each transect crosses Route 6 will be located and marked. The investigators will walk each transect on NPS land from Route 6 to the Atlantic Ocean (to the north or east for each transect except #1, which is walked toward the west). The sampling procedure along each transect is given below.

Procedure for transect samples

- Each transect will be walked along a compass bearing and distances along the transect will be paced. From Route 6, the investigator will walk ten paces, stop, and record data at that point. Data will be recorded at points every ten paces to the end of the transect (each pace should equal approximately one meter).

- At each sampling point (Fig. 1), the investigator will record the distance to the nearest winter web (measured with a tape measure), and to the nearest plant bearing at least one winter web within a 100 m^2 quadrat with the sampling point at its center (a square with edges 5 m from the sampling point in each direction along the transect, and 90° to each side). For the purposes of this sample, a plant is defined as a single stalk coming from the ground (underground stolons or attachments to other plants or clusters of plants are ignored). Only the current year's winter webs should be included. The species of plant bearing the winter webs should be recorded. The nearest plant bearing winter webs is recorded regardless of whether the winter webs themselves fall within the 100 m^2 quadrat surrounding the sampling point.

Figure 1. Sample area at each sampling point along transect. Sampling points are 10 paces apart along the entire transect from Route 6 to the Atlantic Ocean.



- The following data will be recorded from each sampling point:
1) transect number, 2) sampling point number, 3) presence or absence of winter webs within 10m X 10m quadrat around sampling point, 4) distance to nearest winter web within quadrat, 5) plant species on which nearest winter web is found, 6) distance to nearest plant within quadrat with at least one winter web (distance to stalk or trunk), 7) plant species of nearest plant with at least one winter web.

- Any winter webs visible from the transect will be noted. In each case, the investigator will measure the extent of the cluster of winter webs (approximate ground area covered, measured with a tape measure), and the approximate number of winter webs in the patch (quick hand count or estimated by using density per unit ground area). The investigator will then return to the last sampling point to continue the transect sample.

- Areas of special interest outside of the transect samples (e.g., the Great Island area in Wellfleet) will be sampled using a similar procedure along sample paths to be determined by the investigators. The placement of the paths will be specifically delineated and described so that the samples can be repeated in subsequent years.

- Any area that displays dense or rapidly increasing populations can be further studied using a complete census of winter webs, or by other appropriate techniques to be determined by the investigators.

Calculations from the transect data

- The data from each transect can be analyzed by calculating:

1) frequency of infestation = percentage of quadrats along transect with at least one winter web.

2) density of winter webs in quadrats with at least one winter web = $1/M_W$, where M_W = (mean distance to nearest web X 2.00)^2 [see Cottam & Curtis. 1956. *Ecology* **37**:451-460]

3) density of plants with winter webs in quadrats with infestations = $1/M_P$ where M_P = (mean distance to nearest plant with web X 2.00)^2

4) number of infestations visible from each transect

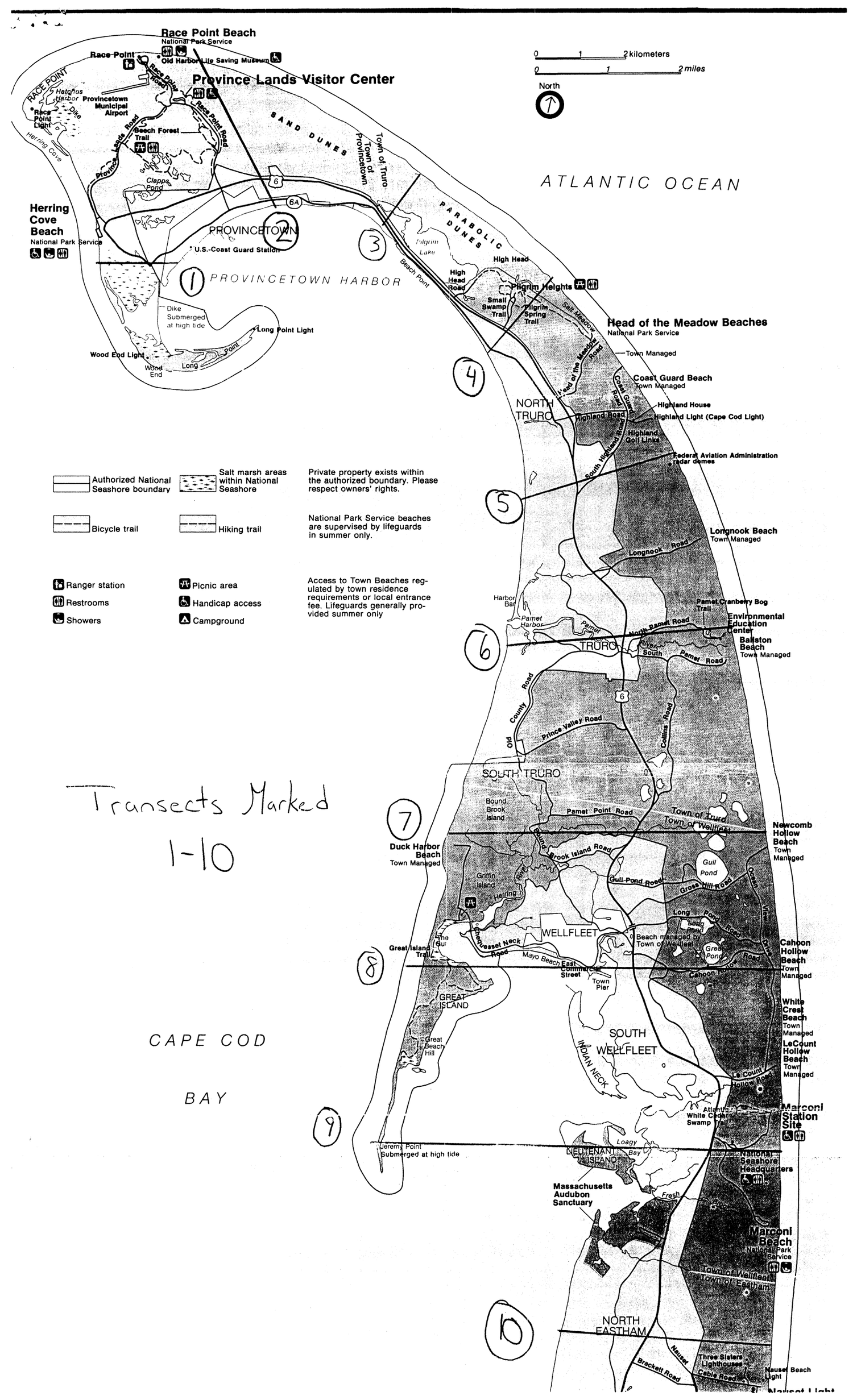
5) mean ground area covered by infestations visible from each transect

6) mean density of winter webs in infestations visible from each transect.

- These data can be plotted along a horizontal axis of distance from the end of Cape Cod (Long Point), and can be compared from one yearly sample to the next to document changes in the geographical extent of the browntail moth infestation on Cape Cod.

Please contact me with any comments about this sampling protocol. I can be reached by phone (401-792-4537), FAX (401-792-6887), E-mail (hsgnsbg@uriacc.uri.edu), or by mail (Howard Ginsberg, National Biological Survey, Woodward Hall-PLS, University of Rhode Island, Kingston, RI 02881). Thanks for your contributions to this effort.

Howard Ginsberg



Transects Marked
1-10